

REMARKS

Claims 1-4 and 6-9 are now pending in the application. Claims 1-4 and 6-9 are amended and claims 5 and 10-12 are cancelled herein. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

SPECIFICATION

The title of the invention stands objected to as being non-descriptive of the invention to which the claims are directed. Although Applicant does not necessarily agree, Applicant amends the title of the invention to read A METHOD FOR EVALUATING A GATE INSULATION FILM CHARACTERISTIC FOR USE IN A SEMICONDUCTOR DEVICE. Accordingly, Applicant respectfully requests reconsideration and withdrawal of this objection.

REJECTION UNDER 35 U.S.C. § 112

Claims 1-12 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject matter which Applicant regards as the invention. This rejection is respectfully traversed. Notwithstanding and solely in the interest of expediting prosecution, claim 1 is amended to a method for evaluating the characteristics of the gate insulation film 3 for use in the semiconductor device 1. Since the recitation "(1) at least a part A/B is 1.8 or more" is part of the method as claimed in amended claim 1, the scope of claim 1 is now definite. It should be noted that the change from apparatus to method claims does not

violate the unity of invention standard to which this National Phase PCT application is subjected. Claims 2-4 and 6-9 depend from claim 1 and are equally definite. Claims 5 and 10-12 are cancelled.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of this rejection.

REJECTION UNDER 35 U.S.C. § 102

Claims 1-12 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kunikiyo (U.S. Pat. Pub. No. 2002/0047169). This rejection is respectfully traversed. Notwithstanding and again solely in the interest of expediting prosecution, Applicant amends claim 1 and cancels claims 5 and 10-12.

Claim 1 calls for a method for evaluating of a gate insulation film characteristic for use in the semiconductor device 1. The semiconductor device 1 includes a semiconductor substrate 2 having a source region 22, a drain region 23, a channel region 21 provided between the source region 22 and the drain region 23 and an element separate structure 24 surrounding the source region 22, the drain region 23 and the channel region 21. The gate insulation film 3 is provided so as to cover the semiconductor substrate 2 and a gate electrode 5 is provided so as to face the channel region 21 via the gate insulation film 3. The gate insulation film 3 is formed of an insulative inorganic material as a main material containing silicon and oxygen. The gate insulation film 3 contains hydrogen atoms. The claimed method comprises: preparing the semiconductor substrate 2; forming the element separate structure 24 so as to compartmentalize one surface of the semiconductor substrate 2 into a plurality of

regions; forming the gate insulation film 3 so as to cover the semiconductor substrate 2 and the element separate structure 24; subjecting the gate insulation film 3 to which an electric field has never been applied to a Multi-Reflection Attenuated Total Reflection Method as Fourier Transform Infrared Spectroscopy at room temperature after formation of the gate insulation film 3 on the semiconductor substrate 2 and the element separate structure 24; and evaluating characteristic of the gate insulation film 3 based on measurement results of the gate insulation film 3 by the Multi-Reflection Attenuated Total Reflection Method, the characteristic being evaluated as to whether the following conditions (1) and (2) are satisfied; (1) at least a part of the absorbance of infrared radiation with a wave number in the range of 830 to 900 cm^{-1} is less than both the absorbance of infrared radiation at a wave number of 830 cm^{-1} and the absorbance of infrared radiation at a wave number of 900 cm^{-1} , and (2) in the case where the absolute value of the difference between the absorbance of infrared radiation at the wave number 830 cm^{-1} and the absorbance of infrared radiation at a wave number of 770 cm^{-1} is defined as A and the absolute value of the difference between the absorbance of infrared radiation at the wave number 900 cm^{-1} and the absorbance of infrared radiation at the wave number 990 cm^{-1} is defined as B, then A and B satisfy the relation: A/B is 1.8 or more.

Since the evaluating method defined in amended claim 1 uses the Multi-Reflection Attenuated Total Reflection Method for evaluating the characteristics of the gate insulation film 3, the gate insulation film 3 is not destroyed. As a result, the method defined in amended claim 1 can be carried out easily to confirm the relationship of the absorbance of infrared radiation corresponding to the mutual influence of the Si-OH

structures 34 and the OSiO structure. Further, the method defined in amended claim 1 does not require much time and high cost, and can still determine the dielectric breakdown characteristic of the insulation film 3 without influencing the insulation film 3 (see page 15, lines 19 to 25).

In contrast, Kunikiyo does not disclose nor suggest a method for evaluating the characteristics of a gate insulation film as claimed in amended claim 1. In fact, Kunikiyo is completely silent with respect to such a method. Therefore, Kunikiyo can not exhibit the effects of the claimed invention. As such, Applicant submits that amended claim 1 cannot be anticipated by Kunikiyo. Further, Applicant submits that a person having an ordinary skill in the art could not arrive at the claimed invention based on the teachings of Kunikiyo.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested.

If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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